

# UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 9517

MSAS NO. 105

OVER THE

SOUTH CHANNEL OF THE ST. LOUIS RIVER

DISTRICT 1 - CARLTON COUNTY, CITY OF CLOQUET

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY  
COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 69)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 9517, Piers 1 and 2, were found to be in good condition with no structurally significant defects observed. Since the last inspection, minor nodular corrosion has developed on the steel pipe piles mainly around the waterline. There was also a moderate accumulation of timber debris at the upstream end of Pier 1. The riprap covered bedrock channel bottom was stable with no significant scour present and with minimal changes since last inspection

INSPECTION FINDINGS:

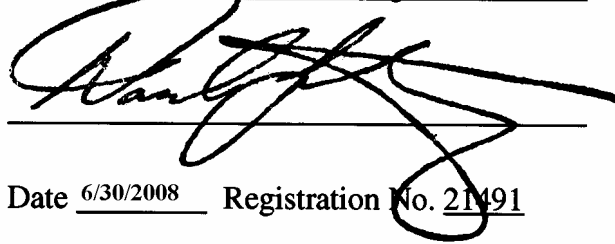
- (A) The steel pipe piles exhibited minor coating failure and up to 1/2-inch-diameter rust nodules on 5 to 10 percent of the surface area mainly around waterline with no related section loss. Pitting was observed with 1/32 inch maximum depth.
- (B) A moderate accumulation of timber debris on the channel bottom was observed at the upstream end and randomly scattered throughout Pier 1, extending from the channel bottom up 3 feet.

RECOMMENDATIONS:

- (A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Daniel G. Stromberg  
Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 9517

Feature Crossed: South Channel of the St. Louis River

Feature Carried: MSAS No. 105

Location: District 1 - Carlton County, City of Cloquet

Bridge Description: The superstructure consists of three spans of prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments and two steel shell pile bent piers. The piers are labeled Piers 1 and 2 starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 29, 2007

Weather Conditions: Sunny, 65°F

Underwater Visibility: 2.0 feet

Waterway Velocity: 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers consist of one line of four steel shell piles drilled 6 feet into bedrock supporting a reinforced concrete cap.

Maximum Water Depth at Substructure Inspected: Approximately 9.3 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap at the west side of Pier 1.

Water Surface: The waterline was approximately 5.5 feet below reference.  
Waterline Elevation = 1179.7 feet.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code F/97

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

       Yes   X   No

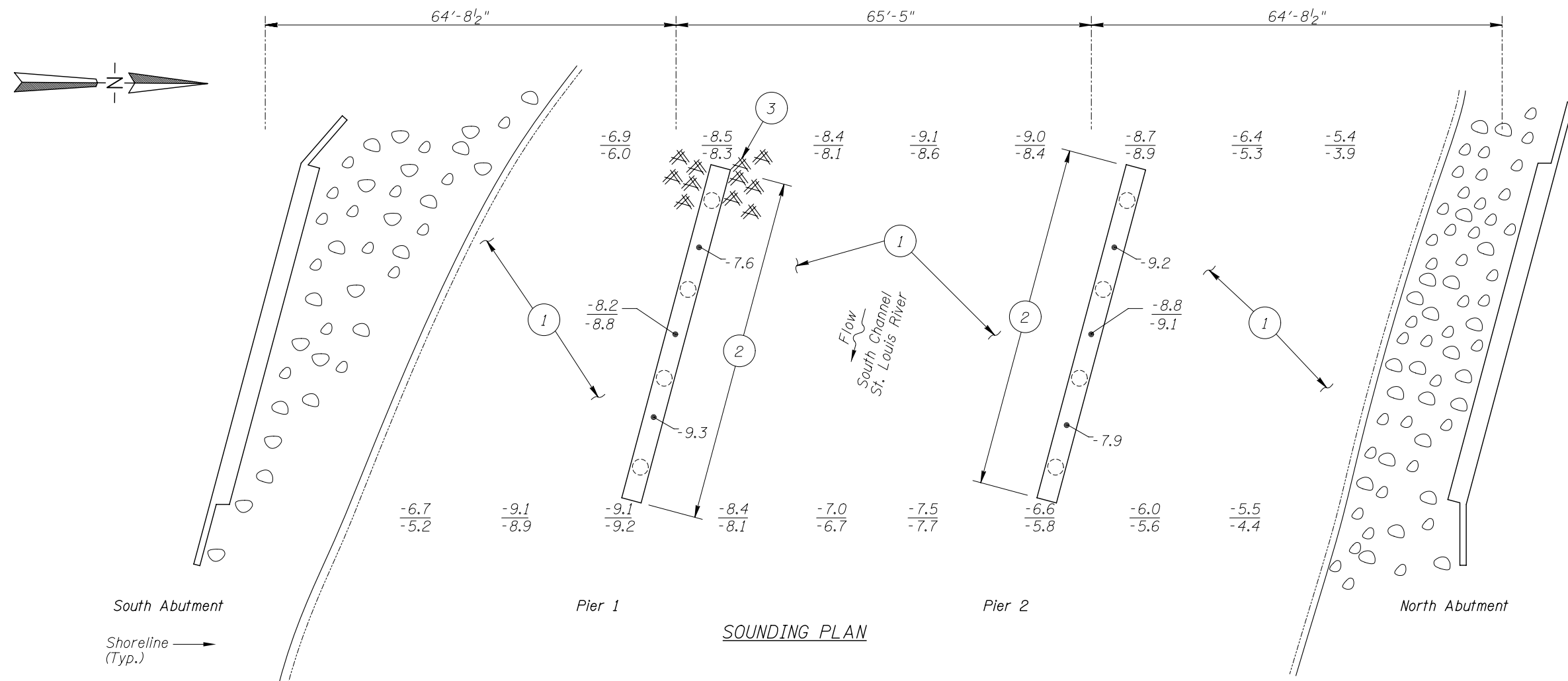


Photograph 1. View of Pier 1, Looking North.



Photograph 2. View of Pier 2, Looking Northeast.





#### GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on August 29, 2007, the waterline was located approximately 5.5 feet below the top of the pier cap at the upstream end of Pier 1. This corresponds with a waterline elevation of 1179.7.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

#### INSPECTION NOTES:

- 1 The channel bottom material consisted of 1- to 3-foot-diameter riprap with no probe rod penetration.
- 2 The steel pipe piles exhibited minor coating failure and up to 1/2-inch-diameter rust nodules over 5 to 10 percent of the surface area (mainly around waterline) with no related section loss. Pitting was observed with 1/32 inch maximum depth.
- 3 A moderate accumulation of 1-foot-diameter and smaller timber debris was observed on the channel bottom at the upstream end and scattered throughout Pier 1. Debris extended from channel bottom up 3 feet.

#### Note:

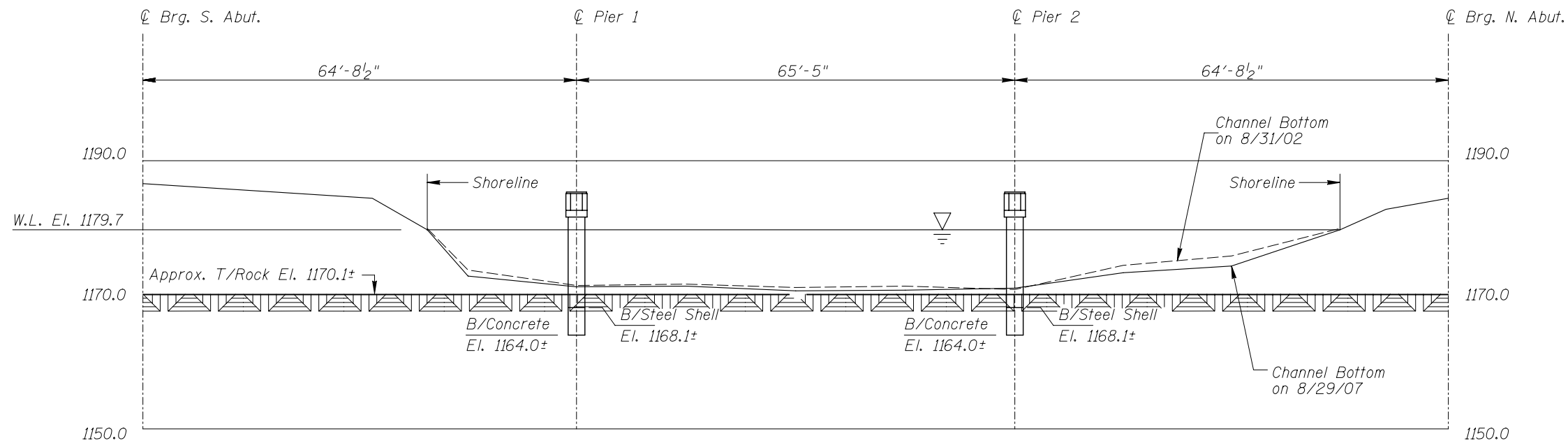
All soundings based on 2007 waterline location.

#### Legend

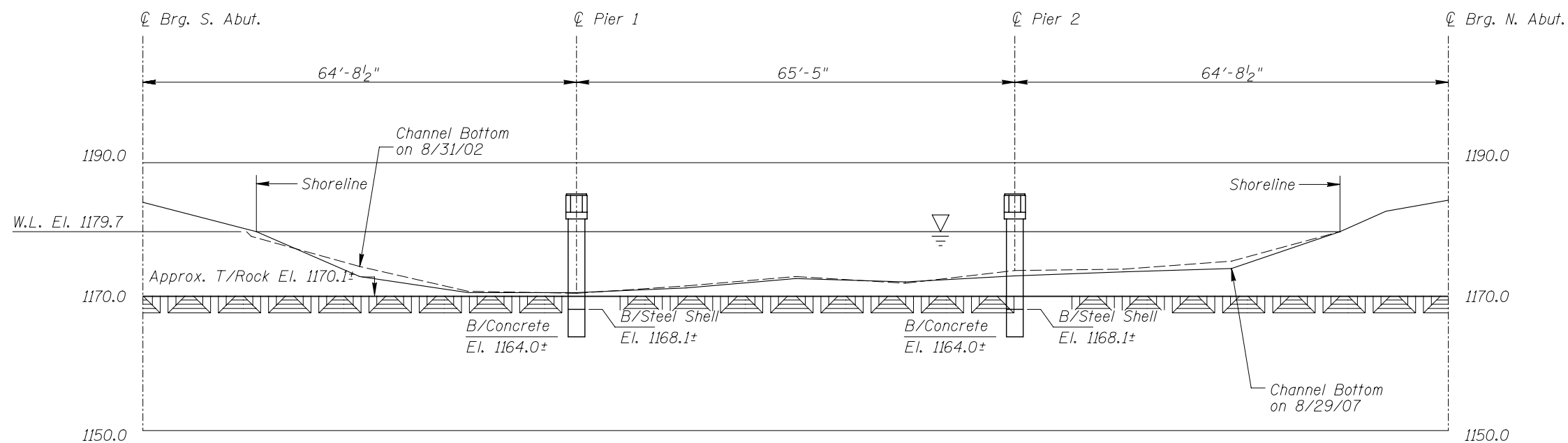
- 2.0 Sounding Depth (8/29/07)
- 5.2 Sounding Depth (8/31/02)
- Steel Shell
- ⌵ Timber Debris

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION			
STRUCTURE NO. 09517 OVER THE SOUTH CHANNEL OF THE ST. LOUIS RIVER DISTRICT 1, CARLTON COUNTY, CITY OF CLOQUET			
INSPECTION AND SOUNDING PLAN			
Drawn By: LJ	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUG. 2007	
Checked By: VR		Scale: NTS	
Code: 52210069		Figure No.: 1	

TYPICAL END VIEW OF PIERS



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Notes:  
Refer to Figure 1 for General Notes.

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 09517  
OVER THE SOUTH CHANNEL OF THE ST. LOUIS RIVER  
DISTRICT 1, CARLTON COUNTY, CITY OF CLOQUET

**UPSTREAM AND DOWNSTREAM  
FASCIA PROFILES**

Drawn By: LJ	<b>COLLINS</b> <b>ENGINEERS</b> <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUG. 2007
Checked By: VR		Scale: 1"=20'
Code: 52210069		Figure No.: 2



MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 29, 2002

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.

BRIDGE NO: 9517 WEATHER: Sunny, 65° F

WATERWAY CROSSED: South Channel of the St. Louis River.

DIVING OPERATION: X SCUBA        SURFACE SUPPLIED AIR  
       OTHER       

PERSONNEL: John J. Loftus, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 4:00 p.m.

TIME OUT OF WATER: 4:30 p.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s.

VISIBILITY 2.0 feet

DEPTH 9.3 feet maximum at Pier 1.

ELEMENTS INSPECTED: Piers 1 and 2.

REMARKS: Overall, the submerged substructure units were in good condition with no significant structural defects observed. The steel shell piles exhibited minor coating failure and up to 1/2-inch-diameter rust nodules on 5 to 10 percent of the surface area mainly around waterline with no related section loss. Pitting was observed with 1/32 inch maximum depth. The channel bottom consisted of riprap and appeared to be stable. A moderate accumulation of timber debris on the channel bottom was observed at the upstream end and randomly scattered throughout Pier 1.

FURTHER ACTION NEEDED:        YES X NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 9517  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.  
WATERWAY CROSSED South Channel of the St. Louis River

INSPECTION DATE August 29, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	9.3'	7	N	N	9	N	7	7	N	8	7	7	N	7	N	7	N	N
	Pier 2	9.2'	7	N	N	9	N	7	7	N	8	N	7	N	7	N	7	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged substructure units were in good condition with no significant structural defects observed. The steel shell piles exhibited minor coating failure and up to 1/2-inch-diameter rust nodules on 5 to 10 percent of the surface area mainly around waterline with no related section loss. Pitting was observed with 1/32 inch maximum depth. The channel bottom consisted of riprap and appeared to be stable. A moderate accumulation of timber debris on the channel bottom was observed at the upstream end and randomly scattered throughout Pier 1.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.